

# INS8073N SBC Notes

Yes, I should make my own PCB design, but in the meantime this will get the board working with 32k RAM to verify whether my INS8073N ICs are any good.

The original design can use either a 6264 or 62256 but it is wired to only provide 1k of address space at 0x1000 with decodes for 0x0C00, 0x1000, 0x1400, 0x1800, 0x1C00.

## RAM Mods

RAM addressing – use a 62256 32kx8. This requires a number of pads around U3 cutting and re-wiring. The re-wiring holes are already on the PCB adjacent to the existing U3 pins, the corresponding address line pins are located adjacent to U4, except for A10 which must be wired to the bus connector hole.

- Remove U5 74LS138, this is no longer required.
- Cut A10/CE2 track pad (top) – re-wire pin 21 to A10 on J1.
- Cut RAM A11 pad to pin 23 (top, label on bottom) – re-wire pin 23 to A11.
- Cut RAM A12 pad to ground (bottom) – re-wire pin 2 to A12.
- Cut 62256 A13 pad to pin 26 (top, label on bottom) – re-wire pin 26 to A13.
- Cut 62256 A14 pad to ground (bottom) – re-wire pin 1 to A14.
- Cut RAM !CE pad (top) – re-wire to A15.

## EPROM Mods

The EPROM is configured for a 27C256 device but is wired to only provide 2k of address space at 0x8000 with decodes for 0x8000, 0x8800, 0x9000,...0xB800. I chose to cut the pad from ROM !CE underneath and re-wired to 8800h. This to prevent any code in the ROM from auto starting at 0x8000. A monitor (Universal Monitor INS8070) was installed in the 27C256. This is activated by **>LINK #8800** from BASIC.

The /OE pins for U2 and U3 are grounded. They should be re-wired to the /RD\_STROBE line from the CPU, but in practice it appears to work in this configuration.

## Serial Interface

The serial port baud rate is set to 110baud with D1 and D2 pulled high via the 4k7 resistor pack. These should instead be wired to ground with 4k7 resistors to increase the speed to 4,800bauds.

The TXO output line should be inverted. It isn't. It is possible to add an inverter by using U6B and ensuring that SENSE\_B is taken either to +5v or ground and not left floating.

The RXI input line should not be inverted.

U7, the MAX232 and associated components are not required if using a CH340 or similar 5V to USB serial converter.

## Chip samples

I have two ICs.

This first one appeared to be unused, labelled **/B8412 INS8073N**. This one works with all 32k Memory.

The second one appears to be used (de-soldered, a pull...) labelled **B8352 INS8073N**. This one seems to have issues with RAM above 0x4000. If I enter NEW #4000 then NEW then PRINT TOP is responds with 1 (expected 16385).

Both ICs would run for a while, then the serial output would start corrupting, then freeze up completely. Only after removing the power then re-applying they would work for a similar period of a few minutes. After considerable investigation, I found the **/NHOLD** pin on pin 5 low, effectively floating, whereas it should be pulled high via a resistor in the R2 pack. This was found to be my bad soldering on pin 5 of the IC socket and now the CPU appears to run without locking up.

Current draw with a 27C256 EPROM and 74HCT TTL is approximately 120mA.